



International Civil Aviation Organization

WORKING PAPER

**TWENTIETH MEETING OF THE METEOROLOGY SUB-GROUP
(MET SG/20) OF THE ASIA/PACIFIC AIR NAVIGATION PLANNING
AND IMPLEMENTATION REGIONAL GROUP (APANPIRG)**

Bangkok, Thailand, 6 – 9 June 2016

Agenda Item 6: Research, development and implementation issues in the MET field

**6.1 Observations, reports, forecasts, advisories and warnings
(including MET/S WG Report)**

REVIEW OUTCOMES FROM MET/S WG/6

(Presented by the Secretariat)

SUMMARY

The MET/S WG/6 meeting was convened following the establishment of the group to replace the former MET/H TF and WAFS TF under the MET SG of APANPIRG. The terms of reference and work programme of the new MET/S WG, which now covers all required aeronautical meteorological services, are presented for review and update as necessary by the MET SG. Work has progressed on the development of regional guidance materials for SIGMET information and aerodrome warnings for tsunamis, but significant progress is still required on the resolution of identified air navigation deficiencies in the MET field in the APANPIRG database.

1. INTRODUCTION

1.1 The sixth meeting of the Asia/Pacific Meteorological Services Working Group (MET/S WG/6) was held in Bangkok, Thailand from 9 to 11 March 2016. The meeting was attended by 63 participants from 17 States and 2 International Organizations. Mr. Chan Pak Wai, Senior Scientific Officer, Hong Kong Observatory, Hong Kong, China, presided as Chair of the meeting and Mr. Peter Dunda, Regional Officer Aeronautical Meteorology, ICAO Asia and Pacific Office, acted as Secretary.

1.2 MET/S WG/6 was the first opportunity for the group to convene following its establishment under MET SG Decision 19/2 – *Expert working groups of the Meteorology Sub-group* to replace the former Meteorological Hazards Task Force (MET/H TF) and World Area Forecast System Task Force (WAFS TF).

1.3 To assist the MET SG in its work programme to improve the quality of meteorological services, but in particular, observations, forecasts, advisories and warnings; including facilitating implementation of the international airways volcano watch (IAVW) and international tropical cyclone warning system, MET/S WG/6 adopted the following agenda:

- Agenda Item 1: Organizational matters
- Agenda Item 2: Review of follow-up from previous meetings
- Agenda Item 3: Quality management of meteorological services
- Agenda Item 4: Planning and implementation of meteorological services
- Agenda Item 5: Review and rectification of deficiencies in meteorological services
- Agenda Item 6: Future work programme
- Agenda Item 7: Any other business

1.4 A conjoint session was held with the fourteenth meeting of the Meteorological Information Exchange Working Group (MET/IE WG/14) on 9 March 2016 to address issues common to both groups including the implementation of SIGMET information and volcanic ash/tropical cyclone advisory information. This part is discussed in more detail in WP/16.

1.5 MET/S WG/6 reviewed and updated its work programme, including actions completed since the previous meeting of the group (i.e., MET/H TF/5). This paper presents a summary of the outcomes from MET/S WG/6 for further review and action as necessary by MET SG/20.

2. DISCUSSION

2.1 A copy of the MET/S WG/6 meeting report, and all related meeting documentation, is available at the following website: <http://www.icao.int/APAC/Meetings/Pages/2016-MET-S-WG6.aspx>.

Review of follow-up from previous meetings

2.2 5 out of 7 action items from the previous meeting (MET/H TF/5) were completed, i.e.: action item 5/1 – WS/WC SIGMET pamphlets were approved, published and distributed as regional guidance material; 5/2 – WV SIGMET pamphlet was drafted; and 5/4, 5/5, 5/6 – drafting of regional guidance material for tsunami (aerodrome) warning and SIGMET for radioactive clouds was progressed.

2.3 One action item was in progress, i.e.: 5/7 – confirmation of membership (in the group) of experts representing IATA and IFALPA; and one action item was yet to commence, i.e.: 5/3 – revision of all SIGMET pamphlets to align with Amendment 77 to ICAO Annex 3. The status of these action items was reflected in the updated action items list (**Attachment 2** refers).

Quality management of meteorological services

2.4 Under the new terms of reference, MET/S WG would promote the requirement of quality management for meteorological services and competency of aeronautical meteorological personnel. APANPIRG/26 (Conclusion 26/58 – *Competency of aeronautical meteorological personnel*) invited ICAO to consider inclusion in Annex 3 of a new provision on the competency of aeronautical meteorological personnel, which would facilitate States with planning and implementation of the competency standards for aeronautical meteorological personnel.

Planning and implementation of meteorological services

2.5 Under the new terms of reference, MET/S WG/6 reviewed outcomes from the second meeting of the Asia/Pacific Volcanic Ash Exercises Steering Group (APAC VOLCEX/SG/2), held in Bangkok, Thailand, from 14 to 16 September 2015, which included debrief for the first ICAO APAC volcanic ash exercise VOLPHIN15/01 (Philippines, 11 August 2015) and planning for second

volcanic ash exercise VOLPHIN16/01 (Indonesia, 17 February 2016). Plans for APAC VOLCEX/SG/3 (Bangkok, Thailand, 14 – 16 March 2016) were noted and would include debrief for VOLPHIN16/01.

2.6 The revised draft *Asia/Pacific Regional Guidance on Aerodrome Tsunami Warnings and their integration into National Public Safety Plan for Tsunami* was reviewed; the ad-hoc group agreed to further revision as necessary before presentation to MET SG/20 for further review and advice as to the possible future use of the document as approved regional guidance material.

2.7 Results from the sixth annual survey on *the operational use of services and products from service providers of the WAFS in the APAC Region and training needs of APAC States on the use of WAFS information* were noted.

Review and rectification of deficiencies in meteorological services

2.8 Twenty (20) air navigation deficiencies in the MET field remain in the APANPIRG list of air navigation deficiencies; overall progress towards resolution and removal of the MET deficiencies in the APANPIRG list was negligible over a period of several years since the deficiencies were first reported, in some cases dating back to 1995.

2.9 MET/S WG/6 noted that:

- Resolution of air navigation deficiencies has been given the highest priority by APANPIRG;
- APANPIRG/26 (September 2015) urged States to put in additional resources to resolve the deficiencies and inform the ICAO Regional Office on the action taken;
- Responsibility of States with deficiencies to provide updates to the information in the deficiencies database;
- Periodic updates should be provided annually (at the least) in order to be available for review by APANPIRG and its Sub-Groups;
- Updates on corrective actions have been infrequent
- In most cases the descriptions of corrective action plans (CAPs) were not concise and lacked defined target dates.

2.10 MET/S WG/6 **ACTION** – Provide updates to MET SG and APANPIRG on the status of corrective action for the air navigation/MET deficiencies in the APANPIRG list [responsibility: States with assistance from Secretariat].

2.11 In accordance with the terms of reference, APANPIRG (and its contributory bodies) shall facilitate the conduct of any necessary systems performance monitoring to assist the development and implementation of action plans by States to resolve identified air navigation deficiencies, where necessary.

2.12 In view of above, targeted SIGMET performance monitoring could be utilised to garner updated information on the status of SIGMET-related deficiencies to further assist the MET SG, States and APANPIRG in monitoring and facilitating the resolution of air navigation deficiencies.

2.13 MET/S WG/6 **ACTION** – Organise and conduct targeted SIGMET performance monitoring based on SIGMET-related air navigation/MET deficiencies in the APANPIRG list [responsibility: RODBs with assistance from Secretariat/chair].

Future work programme

2.14 MET/S WG/6 reviewed and revised the terms of reference and work programme document, incorporating the new terms of reference provided by MET SG/19 and the existing membership, tasks and work programmes of the former groups (MET/H TF and WAFS TF). A copy of the revised terms of reference and work programme document of the MET/S WG is provided at the **Attachment 1** to this paper for further review and action as necessary by the MET SG.

2.15 The updated task list from MET/S WG/6 is provided at the **Attachment 2** to this paper.

Any other business

2.16 **Next meeting** – MET/S WG/7 was tentatively scheduled for 22 – 24 March 2017, in Bangkok, Thailand, including a conjoint session with the MET/IE WG/15 on 22 March 2017.

3. CONCLUSION

3.1 MET/S WG/6 reviewed progress on aspects of the MET SG work programme aimed at improving the quality of meteorological services, in particular, observations, forecasts, advisories and warnings, and reported on actions completed, including the development of regional guidance materials: WS/WC SIGMET pamphlets were approved, published and distributed; WV SIGMET pamphlet was drafted; and draft guidance for tsunami (aerodrome) warning and SIGMET for radioactive clouds was progressed.

3.2 MET/S WG/6 noted that significant progress was needed to improve reporting on the development, implementation and progress of States' CAPs for the resolution of air navigation deficiencies in the MET field identified in the APANPIRG database. Validation of corrective action taken in some States to resolve MET deficiencies need to progress, also. Actions were proposed to support this work.

3.3 Taking into account the work at hand, MET/S WG/6 revised its terms of reference and work programme for further review and action as necessary by the MET SG.

4. ACTION BY THE MEETING

4.1 The meeting is invited to:

- a) Note the information in this paper; and
- b) Propose further updates to the terms of reference and work programme of the MET/S WG, as necessary.

**ICAO ASIA/PACIFIC METEOROLOGICAL SERVICES WORKING GROUP
(MET/S WG)**

TERMS OF REFERENCE AND WORK PROGRAMME
(Extracted from MET/S WG/6, Attachment 4 to the Report)

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2.DESCRPTION	
Objective	Improve the quality of meteorological services, in particular, observations, forecasts, advisories and warnings – including facilitating implementation of the International Airways Volcano Watch (IAVW) and International Tropical Cyclone Watch (ITCW) – in support of the global air navigation plan framework and the aviation system block upgrade (ASBUs) methodology.
Benefits	Improve the safety and efficiency of flight and ground operations.
Terms of Reference	Under guidance from ICAO APAC MET Secretariat: <ul style="list-style-type: none"> a) Identify and evaluate current and future requirements with respect to meteorological services, in particular, observations, forecasts, advisories and warnings, in support of the aviation system block upgrades (ASBUs); b) Promote the implementation of meteorological services; c) Promote the requirement for, and benefits of, QMS for MET services and competency of aeronautical meteorological personnel; d) Maintain awareness of, and identify new, meteorological deficiencies and formulate strategies to resolve these deficiencies; e) Continually seek ways to improve the quality, compliance against SARPs and operational effectiveness of the meteorological services; Monitor the implementation and use of products and services under the framework of the World Area Forecast System (WAFS), the International Airway Volcano Watch (IAVW) and the International Tropical Cyclone Watch (ITCW); f) Monitor the relevant activities of the MET Panel and appropriate bodies; and g) Provide advice and report to the MET Sub-group on the above issues for further co-ordination through the ICAO Secretariat with other appropriate bodies.

Work Program	<p>The work to be addressed by the ASIA/PAC MET/S WG includes:</p> <ul style="list-style-type: none"> • Review procedures for the issuance of meteorological observations, forecasts, advisories and warnings in the region and propose actions for their improvement to related performance objectives; • In conjunction with MET/IE WG, investigate the deficiencies in the format and dissemination of meteorological observations, forecasts, advisories and warnings and propose remediation plans; • Respond to the needs of the guidance and/or training related to the implementation of meteorological observations, forecasts, advisories and warnings and inform MET/IE WG of changes required to the SIGMET guide; • In conjunction with MET/R WG and in support of the ASBUs, provide meteorological input for operational planning for specific phenomenon including volcanic ash, radioactive cloud, tropical cyclone, tsunami and space weather; • Follow the developments in the States related to the improvement of meteorological observations, forecasts, advisories and warnings and provide regional input on these matters to relevant ICAO and WMO groups and to gather user requirements from ANSPs, IATA, IFATCA and IFALPA; • Investigate options for rectification of air navigation deficiencies in the field of meteorological services in APAC States; • Provide support for the ICAO APAC volcanic ash exercises; • Report on its work to the MET Sub-group of APANPIRG; and • Maintain a link to the Regional ATM Contingency Plan Task Force (RACP/TF).
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3. COMMUNICATION STRATEGIES

Description	Target Audience	Delivery Method	Frequency/ Date	Responsibility
Work Plan	Working Group Members	Document via email and posted on ICAO Bangkok website	As required but reviewed at least quarterly	Chair
General correspondence	Working Group Members	Email	As required	Working Group Members
Working Group Meeting	Working Group Members	Meeting in conjunction with MET/IE WG	Yearly in March	Chair
Status & Milestone Reports	ICAO Secretariat and Working Group Members	Report via email	Quarterly	Chair
Working Group Report	MET/S WG and MET/IE WG	Working Paper	Yearly	Chair
Working Group Report	MET SG	Working Paper	Yearly	Secretariat

4. PERFORMANCE FRAMEWORK FORM (PFF)

Tasks	Time Frame	Responsibility	Status	Milestone
Task 1: Monitor and provide assistance to the regional implementation of meteorological observations, forecasts,	2016-2019	MET/S WG	In progress	1

warnings and advisories				
Task 2: Track and investigate deficiencies in the format and dissemination of meteorological observations, forecasts, warnings and advisories and propose corrective action and provide information to ICAO and WMO groups for possible assistance	2016-2018	MET/S WG and MET/IE WG	In progress	1,2
Task 3: Review WC, WV & WS SIGMET test results and implement improvements.	2016-2018	MET/S WG	In progress	1
Task 4: Provide guidance and/or training related to the implementation of meteorological observations, forecasts, warnings and advisories, including input to the Regional SIGMET Guide as they relate to the Annex 3 amendment cycle.	2016	R/O, MET/S WG and MET/IE WG	In progress	1,3
Task 5: Provide input into regional operational plans as required for specific phenomenon, including VA, radioactive cloud, TC, Tsunami and Space Weather, with consideration to global ICAO groups and WMO developments.	2016-2018	MET/S WG and MET/R WG	In progress	3
Task 6: Investigate, and implement as appropriate, options to assist States in resolving air navigation deficiencies in the field of meteorological service.	2016	MET/S WG	In progress	4
Task 7: Monitor the implementation and utilization of WAFS and training needs within the ASIA/PAC Region, and report to MET SG	2016-2019	MET/S WG	In progress	5

5. MILESTONES

Milestone	Accountability	Dates	Status
<i>Milestone 1: Report on SIGMET test results and regional performance to MET SG</i>	<i>Chair</i>	<i>Annually</i>	
<i>Milestone 2: Guidance and educational material available</i>	<i>Chair</i>	<i>TBD</i>	
<i>Milestone 3: MET input provided for ASIA/PAC Regional ATM Contingency Plans</i>	<i>ad-hoc group</i>	<i>Next meeting</i>	
<i>Milestone 4: Reduction in air navigation deficiencies in the field of meteorological service.</i>	<i>States</i>	<i>TBD</i>	
<i>Milestone 5: Conduct survey on the implementation and utilization of WAFS and training needs within the ASIA/PAC Region and report to MET SG</i>	<i>Chair</i>	<i>Every 2 years</i>	

6. WORK PLAN

Task / Milestone	Accountability	Predecessors	Date	Status
Activity 1: SIGMET TESTS				

6. WORK PLAN				
Task / Milestone	Accountability	Predecessors	Date	Status
Task 1.1: Review SIGMET tests (conjoint session with MET/IE WG)	Working Group	-	Annually	
Task 1.2: Develop action plan to fix identified deficiencies	Chair in conjunction with the Working Group	conjoint session with MET/IE WG	During meeting	
Task 1.3 Report back to MET SG on regional performance and action plan	Chair		Annually	
<i>Milestone 1: Report on SIGMET test results and regional performance to MET SG</i>	Chair	-	<i>Annually</i>	
Activity 2: GUIDANCE AND EDUCATIONAL MATERIAL				
Task 2.1: a) Review current SIGMET poster information b) Publish information in pamphlet form c) Review SIGMET pamphlets with future regard to Annex 3 Amendments 77	Australia, Hong Kong, China, Japan and New Zealand (Rapporteur) in conjunction with ICAO HQ and WMO	-	TBD August 2016	
Task 2.2: Review radioactive cloud survey results and develop guidance Monitor international development for of radioactive cloud SIGMET inclusion in the SIGMET Guide	China (Rapporteur), Hong Kong, China, Japan	-	TBD	
Task 2.3: Review tsunami survey results and develop the draft guidance of tsunami warning in line with proposal for Amendment 77 to Annex 3 and present the guidance to MET SG for endorsement	Japan (rapporteur), Australia, Indonesia		TBD June 2016	
Task 2.4: Forward proposed amendments to the SIGMET Guide template to appropriate expert group determined by MET Panel Review the regional SIGMET Guide to be in line with Amendment 77 to Annex 3	Australia (rapporteur), Japan, Hong Kong, China and New Zealand in conjunction with Secretariat		TBD June 2016	
<i>Milestone 2: Guidance and educational material available</i>	Chair		2016 TBD	
Activity 3: REGIONAL CONTINGENCY PLANS				
Task 3.1: Get a list of requirements from RACP/TF	Secretariat	-	Next RACP/TF	
Task 3.2: Provide information on hazardous meteorological	ad-hoc group (TBC)	-	Next meeting	

6. WORK PLAN				
Task / Milestone	Accountability	Predecessors	Date	Status
phenomena to ATM group for inclusion in the ATM contingency plan, if required (after outcome of RACPTF is known)				
<i>Milestone 3: MET input provided for ASIA/PAC Regional ATM Contingency Plans</i>	Secretariat ad-hoc group	3.1-3.2	Next meeting	
Activity 4 – SIGMET Deficiencies				
Task 4.1: Investigation Review options to eliminate SIGMET deficiencies-	ad hoc group #1: New Zealand (rapporteur), Australia, China, Japan, Indonesia, and Hong Kong, China		Oct-2014 Sep 2016	Complete
Task 4.2: Monitor the provision of SIGMET services from States with SIGMET deficiencies	ad hoc group #2: Australia, Japan (rapporteur), Singapore and Thailand, in conjunction with MET/S WG chair and Secretariat	4.1	May 2016 and Feb/Mar 2017	
Task 4.23: Assist the ICAO Secretariat in the facilitation of discussion of viable options with relevant States.	ad hoc group #1	4.1	TBD Ongoing	
Task 4.34: Monitor the implementation of the solution/s to remove deficiencies.	ad hoc group #1	4.2	Ongoing	
Task 4.45: Monitor global development on the establishment of a regional advisory system for hazardous weather.	ad hoc group #1		Ongoing	
Task 4.56: Report progress to MET SG	Rapporteur of ad hoc group #1	4.3	Jun-2016 Ongoing	
<i>Milestone 4: Reduction in SIGMET deficiencies.</i>	States		2016	

Activity 5 – Conduct survey on implementation and utilization of WAFS (including SADIS and WIFS services) and training needs within the ASIA/PAC Region and report to MET SG				
Task 5.1: Develop a survey on the current and future implementation of WAFS (including SADIS and /WIFS services), the utilization of WAFS forecasts and WAFS training needs	MET/S WG		Nov 2017 2-yearly	

Task 5.2: Distribute the survey to States	MET/S WG chair	5.1	Dec 2017 2-yearly	
Task 5.3: States to respond to survey	States	5.2	Jan 2018 2-yearly	
Task 5.4: Analyse survey results	MET/S WG chair	5.3	Feb 2018 2-yearly	
Task 5.5: Present findings to MET/S WG and MET SG	MET/S WG chair	5.4	Mar and June 2018 2-yearly	
<i>Milestone 5: Conduct survey on implementation and utilization of WAFS (including SADIS and WIFS services) and training needs within the ASIA/PAC Region and report to MET SG</i>	MET/S WG chair	5.1 – 5.5	2-yearly	

DRAFT

**ICAO ASIA/PACIFIC METEOROLOGICAL SERVICES WORKING GROUP
(MET/S WG)**

TASK LIST

(Extracted from MET/S WG/6, Attachment 3 to the Report)

MET/H TF/5 – Adapted from Appendix D to the Report of MET/H TF/5

(Highlighted text indicates updated information)

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
5/1	Submit paper including draft [WC and WS] SIGMET pamphlets and a proposal for appropriate publication/distribution of the (approved) pamphlets in electronic form through MET SG/19 to APANPIRG/26 and/or ICAO HQ and WMO for adoption as regional guidance material.	July 2015	Ad-hoc group, comprising Australia, Hong Kong-China and New Zealand (Rapporteur)	COMPLETED Related to MET/H TF/5 Decision 5/1
5/2	Develop a draft [WV] SIGMET pamphlet for review and approval (include in 5/1 if possible).	February 2016	Ad-hoc group, comprising Australia, Hong Kong-China and New Zealand (Rapporteur)	COMPLETED Related to MET/H TF/5 Decision 5/1
5/3	Revise all SIGMET pamphlets as necessary, and submit drafts for approval, to align with, in time for the applicability of, Amendment 77 to ICAO Annex 3.	August 2016	Ad-hoc group, comprising Australia, Hong Kong-China, Japan and New Zealand (Rapporteur)	To commence Related to MET/H TF/5 Decision 5/1
5/4	Obtain further comments on the draft tsunami warning guidance in WP/5 and the draft regional guidance material on SIGMET for radioactive clouds in IP/3.	July 2015	Secretariat and MET/H TF	COMPLETED Related to MET/H TF/5 Decision 5/2 and 5/3
5/5	Revise the draft guidance material on tsunami warning as necessary, and ensure that end user consultation is a key component during the integration of aerodrome tsunami warning service into national tsunami warning systems, and submit a paper to MET SG/19	July 2015	Ad-hoc group comprising Indonesia and Japan	COMPLETED Related to MET/H TF/5 Decision 5/2
5/6	Revise the draft guidance material on SIGMET for radioactive clouds as necessary and submit a paper to MET SG/19.	July 2015	Ad-hoc group comprising China (rapporteur), Hong Kong-China and Japan	COMPLETED Related to MET/H TF/5 Decision 5/3

ACTION ITEM	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
5/7	Confirm the MET/H TF membership contact details and invite IATA and IFALPA to nominate relevant experts for membership.	June 2016	Secretariat	IN PROGRESS Related to MET/H TF/5 Decision 5/4

MET/S WG/6 – Adapted from the Report of MET/S WG/6

TASK	DESCRIPTION	BY DATE	RESPONSIBILITY	STATUS/REMARKS
6/1	Provide updates to MET SG and APANPIRG on the status of corrective action for the air navigation deficiencies in the MET field in the APANPIRG list	Jun 2016	Members, Secretary	TO BEGIN [Ref: MET/S WG/6 Report para. 5.5]
6/2	Organise and conduct targeted SIGMET performance monitoring based on SIGMET-related air navigation/MET deficiencies in the APANPIRG list	Jun 2016	Members, Secretary	TO BEGIN [Ref: MET/S WG/6 Report para. 5.7]
